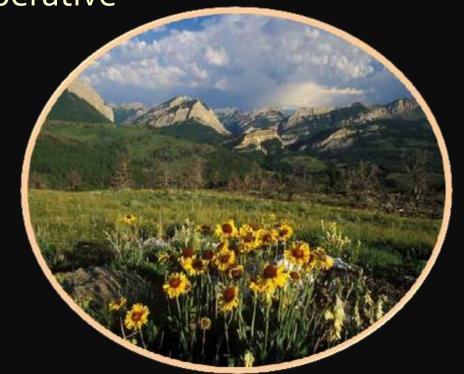


Great Northern

Landscape Conservation Cooperative

April 2010 – April 2011

A Year in Review



"The conservation community face unprecedented issues of scale, pace, and complexity in sustaining our Nation's fish and wildlife resources."



"The conservation challenges of the 21st Century represent a force of change more far-reaching and consequential than any previously encountered."

Also....

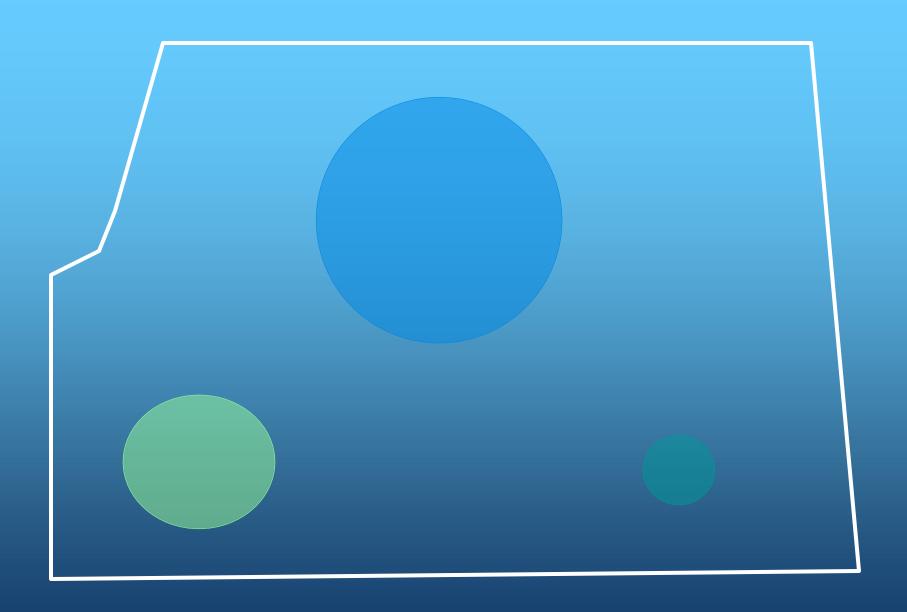
Technological Advances

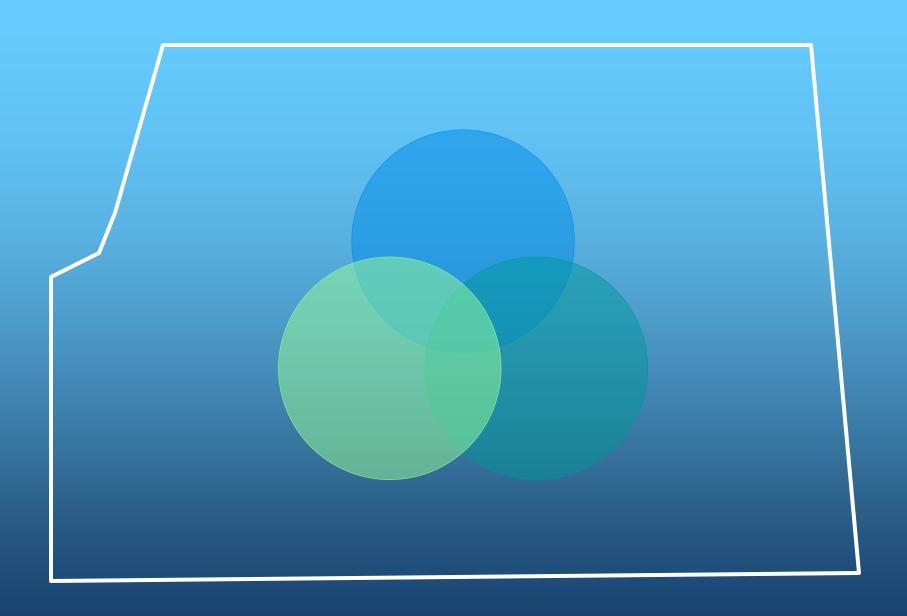
- Communications (web, cell phones)
- Computation (models)
- Transmission (data)
- Data power and resolution (satellites)

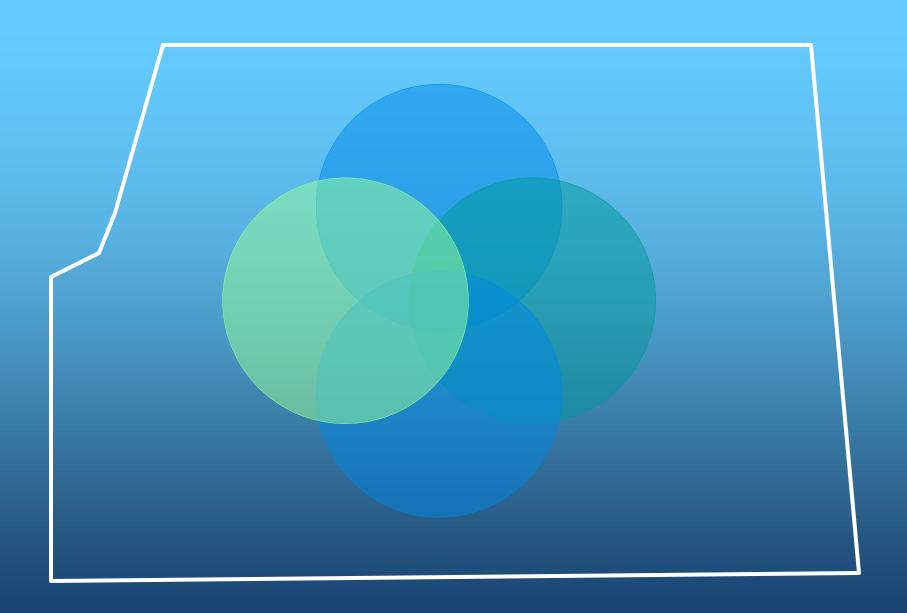
Opportunity....

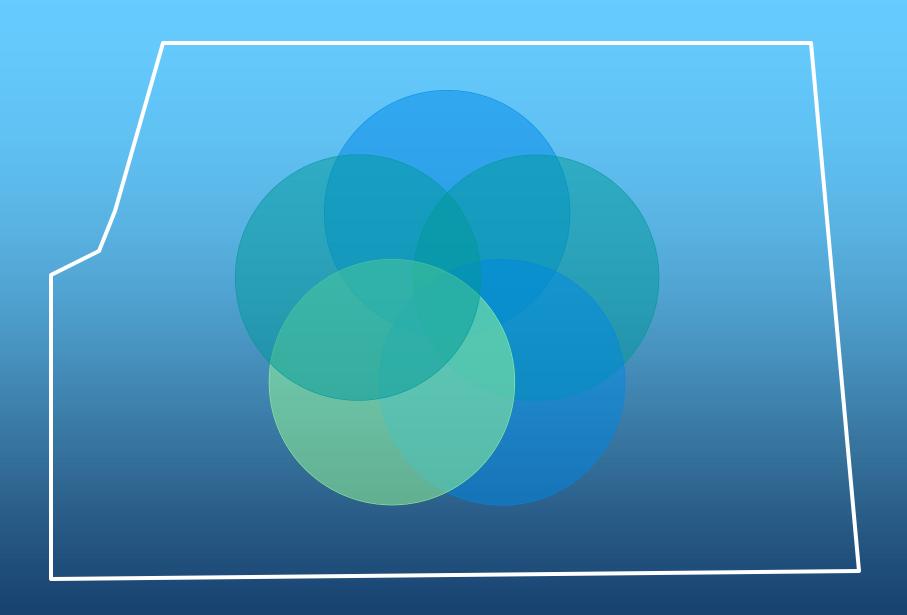
Expectation

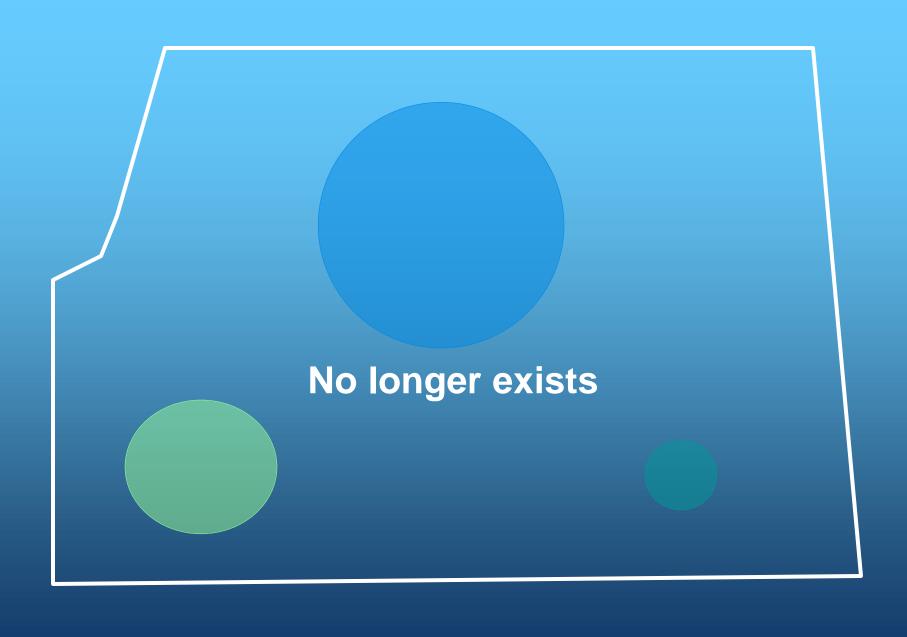












OVERLAP

Geographically
Jurisdictionally
Operationally
Institutionally

Coordination, Communication, Collaboration



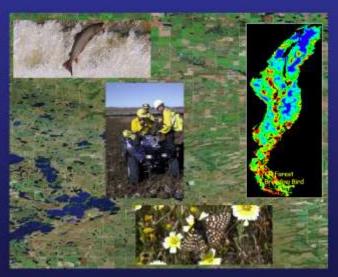
DRAFT

Adaptive Management

The U.S. Department of the Interior Technical Guide

Strategic Habitat Conservation

Final Report of the National Ecological Assessment Team





U.S. Fish & Wildlife Service

Rising to the Challenge

Strategic Plan for Responding to Accelerating Climate Change



Appendix: 5-Year Action Plan

for Implementing the Climate Change Strategic Plan



Adaptive Managen Working Group



Rising to the Challenge

Strategic Plan for Responding to Accelerating Climate Change

National Park Service

Climate Change Response Strategy

on Mitigation



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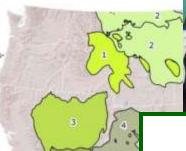
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Rapid Ecoregional Assessments

The BLM launched seven REAs in 2010. This map shows the general outlines of the ecoregions being assessed.

- Middle Rockies
 - Northwestern Glaciated Plains-Northwestern Great Plains
 Control Basin and Great
- 3. Central Basin and Range 4. Colorado Plateau
- 5. Mojave Basin and Range
- 6. Sonoran Desert
- Seward Peninsula-Nulato Hills-Kotzebue Lowlands



A VISION FOR CLIMATE SERVICES IN NOAA





20ot 08

plies Force Report + Lincoln matrices of Land Roles

Large Landscape Conservation: A Strategic Framework for Policy and Action



MATTHEW BURNINGS LIVE SCARLETT, AND DANIEL RESIDENCE

Forest Service Strategic Framework For Responding to Climate Change

Version 1.0



The conservation of natural recoveres is the bey to the future. It is the key to the suffer and prosperts of the American people, and all of the people in the world, for all time to come. The very extreme of our Nation, and of all the rest, depends on conserving the resources which are the foundation of to the.

- Gifford Pinchot

Why LCCs?

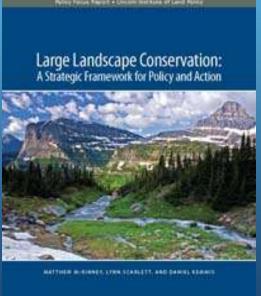
Report - Large Landscape Conservation:

A strategic framework for policy and action McKinney, Scarlett & Kemmis, 2010

"...there is a gap in governance and a corresponding need to create informal and formal ways to work more effectively across boundaries."

Barriers to Landscape Conservation

- Lack of scientific information
- Lack of capacity to organize
- Lack of a strategy to coordinate
- Fragmented financial investments



Funding for Conservation Delivery (US)

from McKinney et al. 2010

- Department of Interior (FWS, USGS, BLM, BIA, BR etc): ~\$500,000,000 for LWCF, NAWCA, NFHAP, SWG and more
- Department of Agriculture (USFS, NRCS):
 - > \$1,000,000,000 for Farm Bill over 5 years
- Environmental Protection Agency
 - > \$1,000,000,000 for CWA and Safe Drinking Water
- Commerce (NOAA) and others



US Department of Interior Secretarial Order No. 3289



September 14, 2009:

"A network of Landscape Conservation Cooperatives will engage DOI and federal agencies, states, tribal and local governments and the public to craft practical, landscape-level strategies for managing climate change impacts..."

http://www.doi.gov/whatwedo/climate/strategy

See links to downloads: Secretarial Order 3289 and Interior's Plan

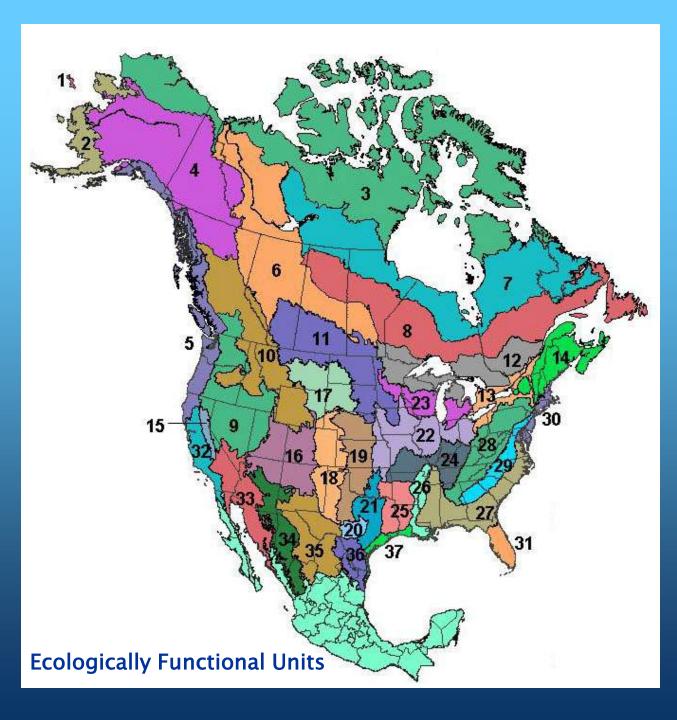


A Continental Approach:

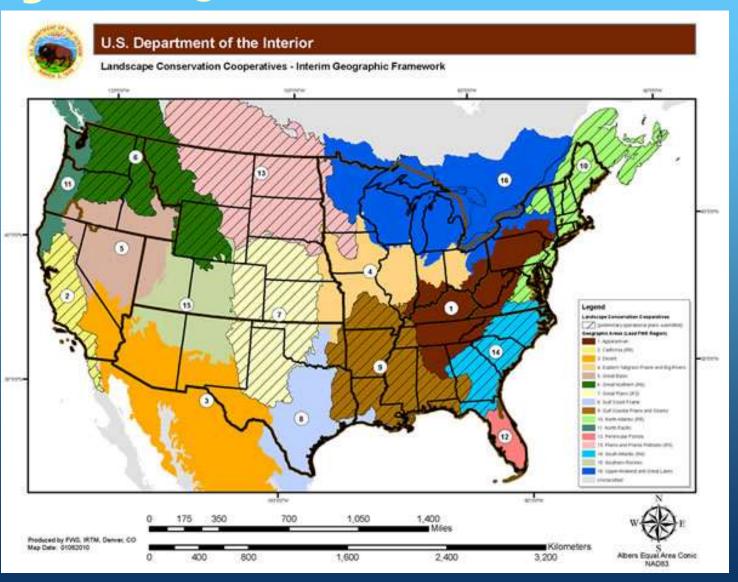
Bailey's Ecoregions

Bird Conservation Regions

River Basins



LCC Geographic Framework August 2009





USA

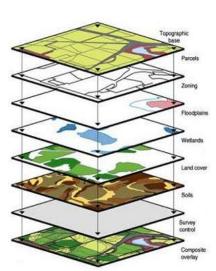
- Montana
- Wyoming
- Idaho
- Washington
- Oregon

CANADA

- British Columbia
- Alberta

FY10 Science Assessment Results

- Climate information (current and projected)
- Land Cover (e.g., Landfire, NLCD)
- Data mgmt/interfacing capabilities and tools
- Habitat Connectivity
- Vulnerability assessments Water Resources
- Biological/Species monitoring/evaluation

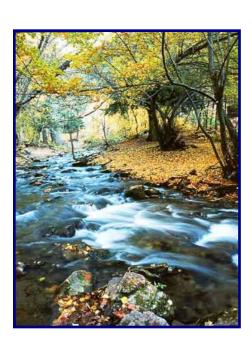




Goal Statement – April 2010

Coordinate, facilitate, promote, and add value to large landscape conservation to build resource resilience in the face of climate change and other landscape-level stressors through:

- SCIENCE SUPPORT
- COORDINATION
- INFORMING CONSERVATION ACTION
- MONITORING AND EVALUATION
- OUTREACH AND EDUCATION

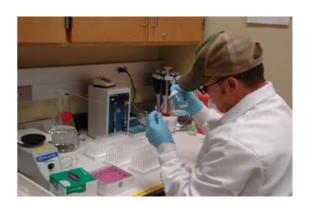




SCIENCE SUPPORT

 Identify and facilitate the development, integration, and application of scientific information needed to inform water, land, and species management decisions in the face of climate changes and other landscape stressors

COORDINATION INFORMING CONSERVATION ACTION MONITORING AND EVALUATION OUTREACH AND EDUCATION





Science Support

COORDINATION

Support coordination and integration of conservation science and actions across ecosystems at the landscape scale, leveraging the capabilities of respective agencies/organizations/ partnerships, and provide real-time situational awareness of on-going conservation efforts

INFORMING CONSERVATION ACTION MONITORING AND EVALUATION OUTREACH AND EDUCATION





Science Support Coordination

INFORMING CONSERVATION ACTION

 Promote conservation actions at the unit and ecosystem level by providing decision support tools and informing conservation action that

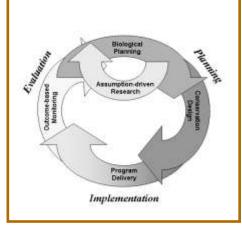
support resource resilience

MONITORING AND EVALUATION OUTREACH AND EDUCATION





Science Support Conservation Action Coordination



MONITORING AND EVALUATION

Monitor landscape scale indicators, test scientific assumptions, and evaluate effectiveness of conservation actions to inform adaptive management decision making.

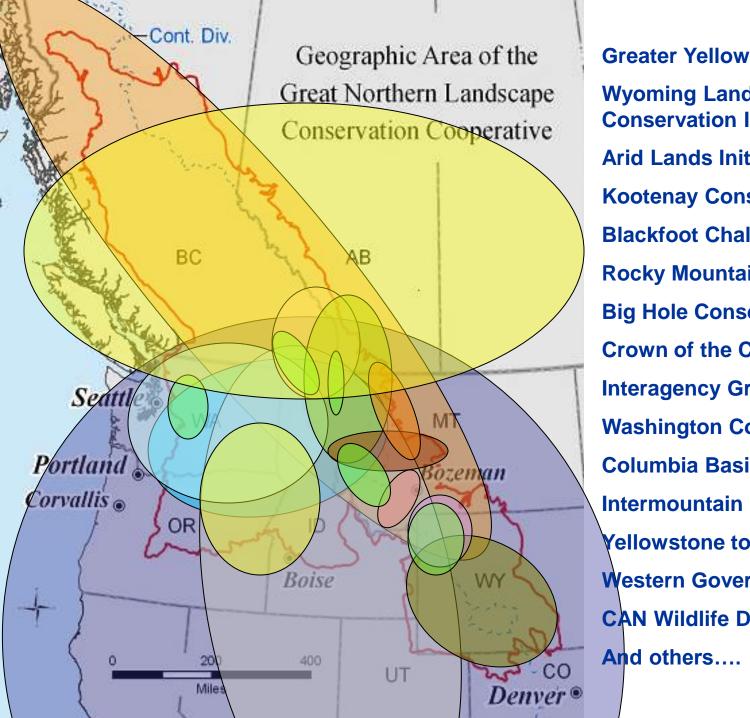
OUTREACH AND EDUCATION



SCIENCE SUPPORT
COORDINATION
INFORMING CONSERVATION ACTION
MONITORING AND EVALUATION

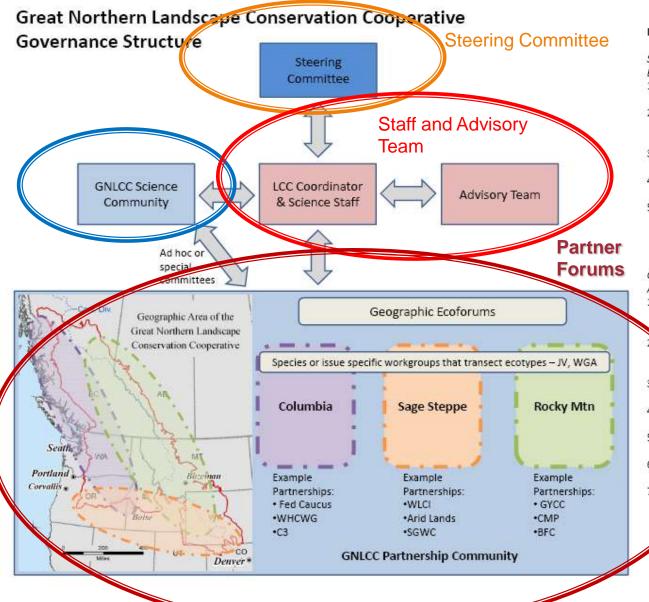
OUTREACH AND EDUCATION

Communicate relevant science information and GNLCC activities and opportunities to partners and users. Advocate for collaborative conservation and seek to leverage capabilities and support.



Greater Yellowstone Coord Comm Wyoming Landscape Conservation Initiative Arid Lands Initiative Kootenay Conservation Program Blackfoot Challenge Rocky Mountain Front Big Hole Conservation Alliance Crown of the Continent

Crown of the Continent
Interagency Grizzly Bear Comm
Washington Connected Lands
Columbia Basin Fed Caucus
Intermountain West JV
Yellowstone to Yukon
Western Governors
CAN Wildlife Directors Council



FUNCTIONS

Steering Committee or Executive Council

- Set vision, Goals and Priorities for GNLCC
- Provide direction to the GNLCC Coordinator and Staff
- Approve Long-term Strategy and Operations
- Approve GNLCC capacity needs
- Approve funding for annual workplan including priority setting process

GNLCC Coordinator and Staff/ Advisory Team

- Promote and communicate long-term vision
- Develop and write longterm strategy and annual workplans
- Coord rate science and information needs
- Develop and implement process for operations
- Develop a nual workplan recomme dations
- Develop and revise Longterm Styrtegy
- 7. Coordinate, communicate and provide outreach to cience and Partnership Communities

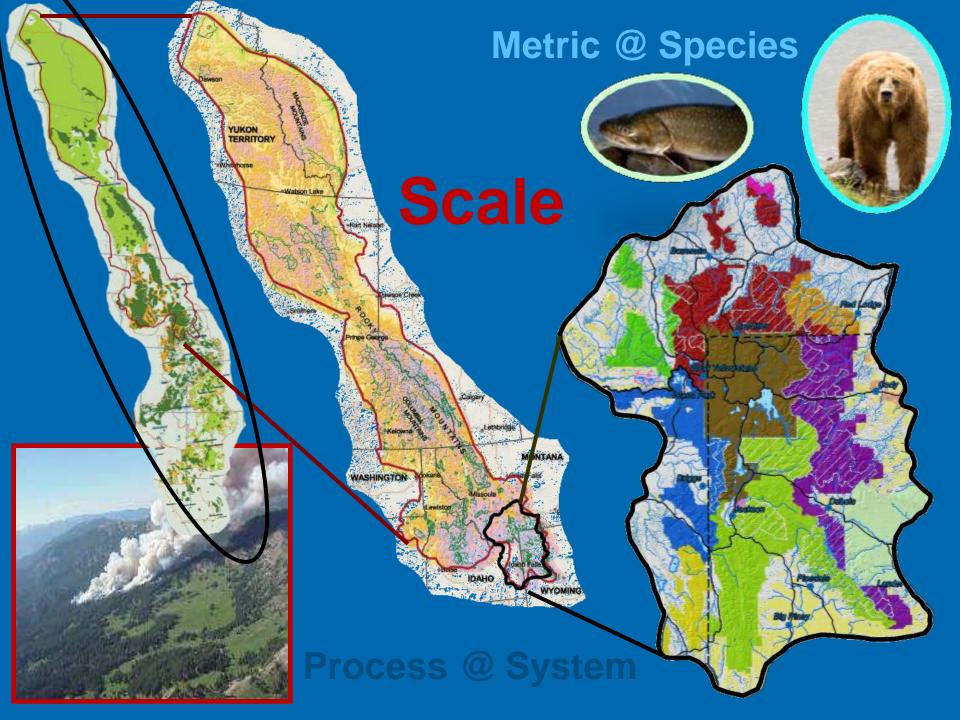
LCC Flagship Conservation Priorities

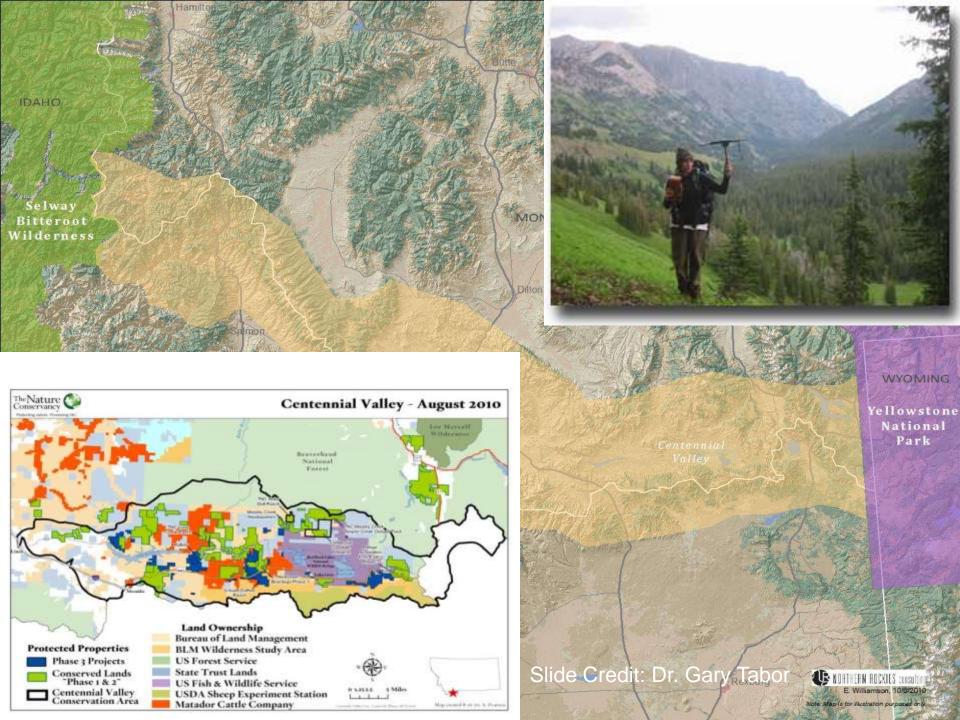
SWAP Analysis August 2010

TOTAL SPECIES = 27	Washington	Oregon	Idaho	Montana	Wyoming	GNLCC	Adv. Team	IWJV
American bald eagle	Yes	Yes	Yes	Yes	Yes			
American white pelican	Yes	Yes	Yes	Yes	Yes			
arctic grayling				Yes	Yes	Yes		
bighorn sheep							Yes	
bull trout	Yes	Yes	Yes	Yes	Yes	Yes		
burrowing owl	Yes	Yes	Yes	Yes	Yes	Yes		
Columbia spotted frog	Yes	Yes	Yes		Yes	Yes		
cutthroat trout (Oncorhynchus clarkii)	Yes	Yes	Yes	Yes	Yes			
ferruginous hawk	Yes	Yes	Yes	Yes	Yes			
fisher	Yes	Yes	Yes	Yes	Yes			
greater sage grouse	Yes	Yes	Yes	Yes	Yes	Yes		
grizzly bear	Yes		Yes	Yes	yes	Yes		
lesser scaup				-				Yes
Lewis' woodpecker	Yes	Yes	Yes	Yes	Yes	Yes		
mallard								Yes
mule deer							Yes	
northern leopard frog	Yes	Yes	Yes	Yes	Yes			
northern pintail								Yes
Pacific lamprey	Yes	Yes	Yes			Yes		
peregrine falcon	Yes	Yes	Yes	Yes	Yes			
pygmy rabbit	Yes	Yes	Yes	Yes	Yes			
salmon/steelhead (Oncorhynchus spp.)						Yes		
sandhill crane								Yes
sharp-tailed grouse							Yes	i i
trumpeter swan	Yes		Yes	Yes	Yes	Yes		
willow flycatcher		Yes	-		Yes	Yes		
wolverine	Yes	5-8000	Yes	Yes	Yes	Yes		
Totals	17	15	17	16	18	12	3	4

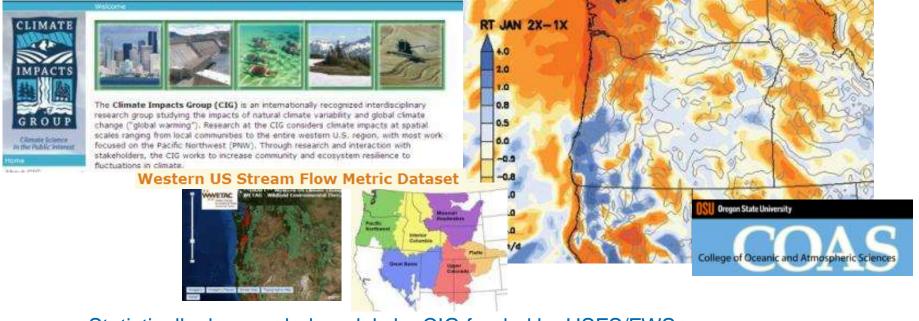
Great Northern-Conservation Priorities Landscape Initiative Analysis

			and Initiatives		1	to	Common			Common
			For Each		7 GNLCC Priority	nitiative	to		_	to
GNLCC State	Initiatives	SVAP	State		Species	5	SWAPs		Processes	Initiatives
Montana	12	1	13		Grizzly bear	4	4		Wildland Fire	3
Idaho	11	1	12		But Hout		4		Insects	
Washington	9	1	10		Steelhead	3	1		Discosioned	1
Oregon		1	9		Salmon	3	2		Disruption of historic disturbance	1
L'increing	8	1	9		Wolverine	3	4		Phenology	1
					Arctic Grayling	2	2		Hurdologic	1
Ecosystems	Common to	Common to			Greater Sage Grouse	2	5			
Shrub-steppe	8	5			16 Non GNLCC Priority Species				Landscape Issues	ti Initia <mark>r</mark> ives
Aspen	4	5			Westslope Cutthroat	4	5		Connectivity	8
Mixed conifer forests	3	4			Yellowstone Cutthroat Trout	4	3		Invasives	7
Grasslands	2	5			Canada lynx	3	4		Climate change	5
Aquatic	2	3			Whitebark pine	2	0		Water Quantity	3
Alpine	2	0			5-needle pines	2	0		Landscape Use	2
Mixed conifer woodlands	1	5			Pygmy rabbit	1	5		Rural Subdivisions	1
Wetland	1	4			Redband Trout	1	4		Energy development	1
Subalpine	1	1			Sharp tail grouse	1	4		Development	1
Mixed grass prairie	1	1			Pine marten	1	3		Water Quality	1
Agricultural	1	1			Bighorn sheep		2		Air Quality	1
High elevation lakes	1	0	Cultura		Kootenai River White Sturgeon	1	2		Ecosystem Health	1
High Desert	1	0	Heritage	е	Elk	1	1		Toxic subtances	1
					Pronghorn	1	1			
					pika	1	1			
					Colorado River Cutthroat Trout	1	1			





Relevant Science Downscaled Climate Models



- Statistically downscaled models by CIG funded by USFS/FWS
- Dynamically downscaled RCM by USGS (S. Hostetler)
- Covers 5 states or more (WA, OR, ID, MT, WY)
- Housed and served by USGS/GNLCC
- •Next:
 - Develop user interface and training
 - •Ecologically relevant variables e.g., WWETAC, I&M Phenology, Streamflow

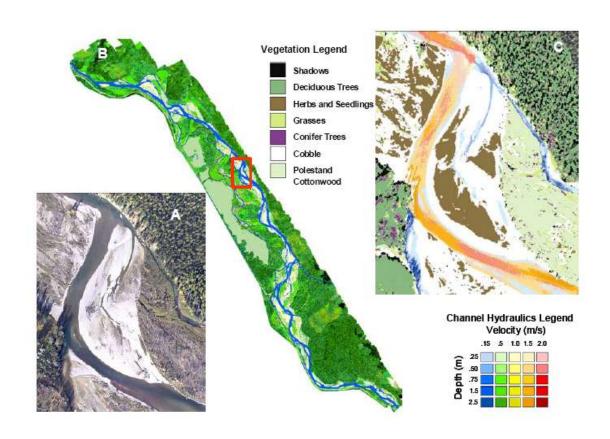
Examples of Transboundary Science supported by Great Northern LCC

- FY10 Crown Managers Partnership Ecosystem Baseline Assessment
 - \$50K to University of Calgary via partnership
- FY10 Large Carnivore Fine-scale Linkages
 - \$150K to University of Montana via IGBC and partnership
- FY10 North Fork of Flathead Watershed Vulnerability Pilot
 - \$140K to USGS, FWS, Flathead Biological Station of UM partnership
- FY10 Washington Connected Landscapes Project
 - \$364K to State of WA, TNC, U of WA, and partners
- FY11: Recommendation will be finalized by June 1, 2011
 - Canadian Intermountain Joint Venture project
 - Okanagan-Similkameen British Columbia Biodiversity Strategy

Predicting Effects of Climate Change on Aquatic Ecosystems in the GNLCC (North Fork Flathead Pilot)

Combining Vulnerability Assessments, Landscape Genomics, and Modeling for Conservation

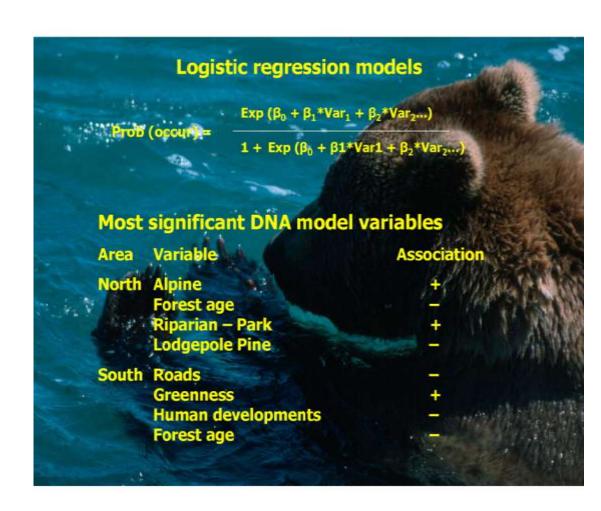
- Remote sensing
- Habitat classification
- Climate analysis
- Species validation



Northern Rockies Fine-scale Linkages

Grizzly Bear Example

- Corridor analysis
- Ecological modeling
- Species validation

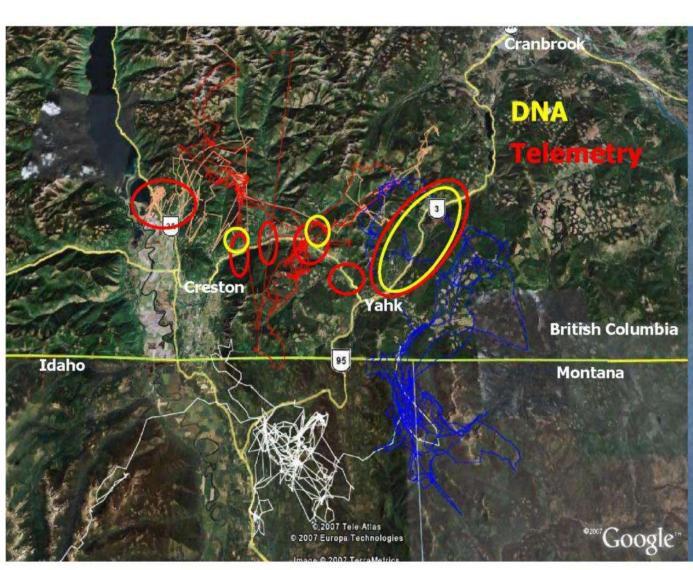


Northern Rockies Fine-scale Linkages Grizzly Bear Example

- Spatial data
- Movement
- DNA info



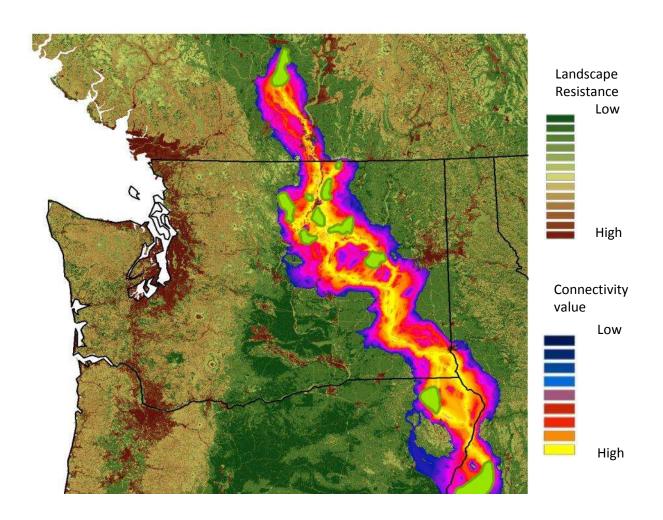
Servheen et al. 2010



Washington Habitat Connectivity Analyses

Columbian Sharp-tailed Grouse Example

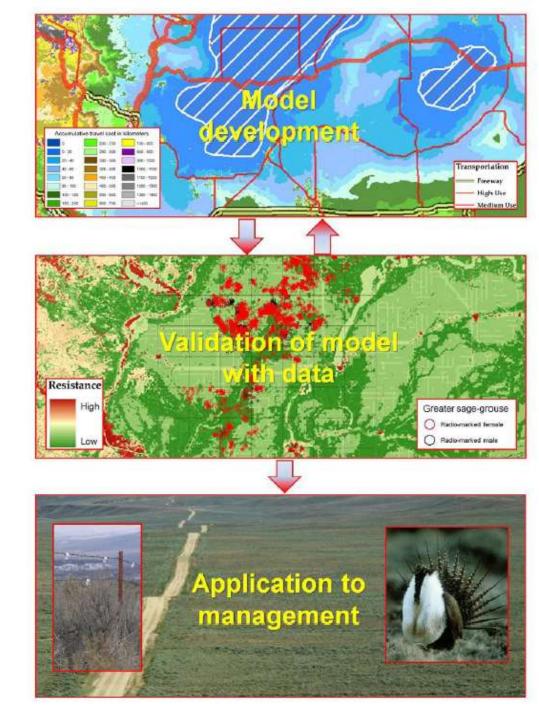
- Corridor analysis
- Species core areas
- Species DNA



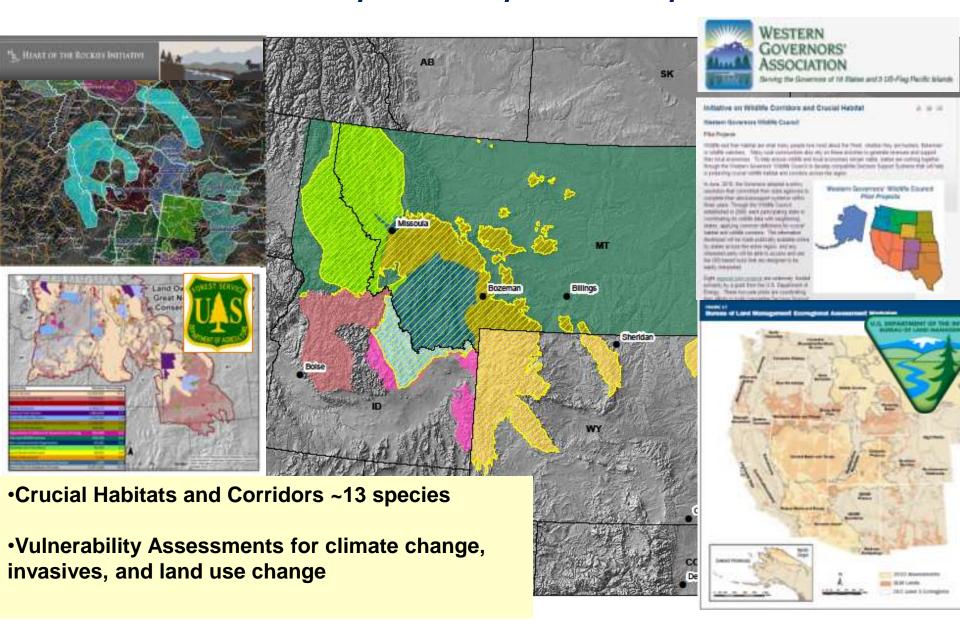
Science to Management

Greater Sage Grouse

- Geospatial information
- Landscape analysis
- Species data
- Ecological model
- Model validation
- Decision support
- Application to mgmt
- Evaluate and revise



Demonstration Collaboration Project: ID-MT&WY WGA DSS, BLM REA, USFS IRPS, HotR Initiative



GNLCC Sponsored Geo-Portal

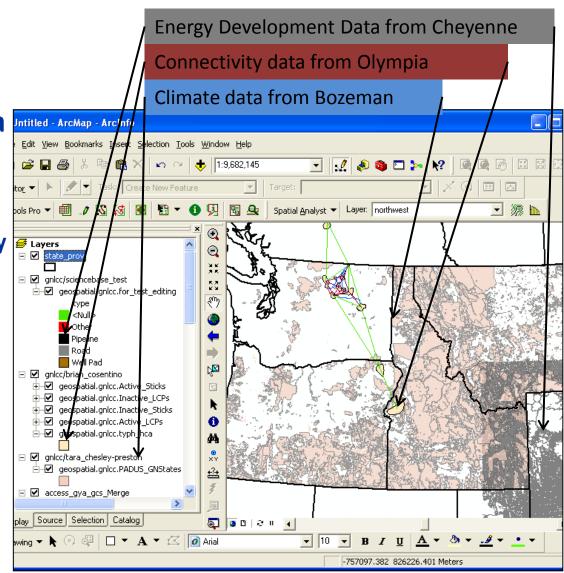
1 Delivery of DS climate data

2 Develops and delivers:

- Web-based collaboration tool
- Leveraged dollars and inter-agency know-how
- Innovative analytical environment

3 Collaborative modeling

- Leveraged funds
- Consistent data facilitates compatible models



Great Northern LANDSCAPE CONSERVATION COOPERATIVE



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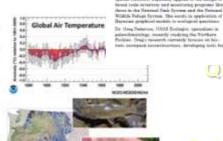
http://www.nrmsc.usgs.gov/gnlcc

Website

WEBINAR: Climate change and aquatic ecosystems of ti Northern LCC

Climate change is expected to significantly effor pounts acceptables of the lineal hortfrent LCC, Selfs Wenger (TV) and Dari Sixan (URFS) will present research results from broadscale studies that stransferies (C) have brout species shiftfultons are predicted to sharge under a warning streats. and which drivers are responsible, and (2) regional efforts to both monitor and model stream temperature responses accordated with a warriery director.

The first study used a statutions of 9850 fest collection often in stemily relationships between fish distributions and air temperature, stream flow, other species, and topic partie carrieries. The results were used to project treat directionies in the Interior West (including result of the US portion of the GNLCCC in the 2040s and 2060s, beenful indigute from silvate and hudrotops models. Yay predictions were the History of traffice sufficient trout Discortiveshus starks by S80% by the 2060s, above by temperature and butto energetions. long produced treat sensing years predicted to during as seed, in part that to stranging flow regions, but hatchers-demost raintion track O. movies over probited to perset with any email met thebres.



Understanding and Adapting To Climate Change in Aquatic Ecosystems at Landscape and River Basin Scales: A decision support workshop

for integrating research and management Concern and uncertainty exist regarding the effects of climate change on equatic ecosystems. Limited information has

> is but new analytical techniques tial data linked to downscaled projections could help. These ovide high resolution information road areas, which may make it to consider management or ion schemes under a range of scenarios. This workshop s an opportunity for researchers. nagers to begin exploring the

been available to guide management.

p objectives: Sather a diverse group of on three objectives: 1) sharing current i n aquanic ecosystems, 2) presenting an ig climate change, and 3) discussing ma of axisting tools, and future information

f these tools.

acitated, interactive two day worksho ect matter specialists providing overvie ffects on streem ecosystems. Day 2 exp. nanagement options under different di

thrusny 28/March 1, 2011 (just prior to louisieTree Riverside, Boise, ID (same w rervations: call 208.343 1871, reference Presentations on Day 1 and 2 can be a of spirestiones: contact Dan Issaik (disage P by Ammary 15, 2011.

Forest Service

tion Program cs Program



Workshops

Great Northern

The purpose of the web-based Resource Directory is to enhance communications and information exchange on landscape-scale conservation. The beta version, currently housed on the Greater Yellowstone Science Learning Center website, contains descriptions of landscape and species initiatives and organizations that conduct conservation work within Great Northern area. In the upcoming months, the Resource Directory will be added to the new GNLCC website and include a geospatial database and other themes such as long-term monitoring efforts and key documents and tools.

Resource Directory

Landscape Initiatives

Projects and partnerships that are setting priorities or supporting onthe-ground landscape conservation. Includes a map that shows the relative locations of where the work is being

Organizations

Programs of government agencies, tribes and nonprofit groups that are relevant to landscape conservation. Initial list is comprised of organizations on the GNLCC Steering Committee.

Monitorina

Descriptions of long-term monitoring efforts are now being compiled. Includes measured indicator or attribute, geographic coverage, location, and lead

Documents and Tools

Existing briefs (1-4 page summaries) on climate change research have been compiled. Key documents and tools for landscape-scale natural resource management will be added.



This image shows the home page of the GNLCC Resource Directory, which is currently housed on the Greater Yellowstone Science Learning Center website. The Resource Directory beta version includes descriptions of Landscape Initiatives and Organizations within the Great Northern area.

GNLCC Resource Directory: http://www.greateryellowstonescience.org/gnlcc

Quarterly Newsletter

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Science Webinars

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FY11 Priorities

- Strategic Framework
- Partner (Eco) Forums
- FY11 Funding Guidance
- Capacity Grant Program
- Collaboration (Demo) Project
 - 2 WGA Pilots
 - BLM Middle Rockies REA
 - USFS IRPS and watershed vulnerability

